

Application No. 10/002,180
Response to Office Action mailed November 10, 2004

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

1. (Previously Presented) A rotary cutting tool comprising:

a tool body in the form of a circular disk having a center and a periphery, with an axis of rotation passing through the center of the disk and a plurality of chip clearance recesses opening outwardly from and spaced angularly around the disk periphery, each chip clearance recess having a leading end and a trailing end, said axis of rotation defining a plane of rotation;

a plurality of insert receiving pockets, each insert receiving pocket having an associated chip clearance recess and comprising a tangentially extending pocket base parallel to said axis of rotation, said pocket base having a leading end and a trailing end, the leading end of the pocket base being adjacent the trailing end of the associated chip clearance recess and the trailing end of the pocket base being connected to a generally radially extending pocket rear surface;

a plurality of indexable cutting inserts, each cutting insert comprising an upper surface, a lower surface and a peripheral side surface therebetween, the peripheral side surface comprising four component side surfaces, each component side surface being joined to an adjacent side surface by a side corner, a first opposite pair of the component side surfaces forming front and rear component side surfaces, each component side surface meeting the upper and lower surfaces at upper and lower component cutting edges, respectively, at least outer portions of each upper and lower component cutting edge extending generally inwardly from adjacent side corners and at least outer portions of each component side surface extending generally inwardly from adjacent side corners,

each cutting insert being removably retained in a given insert receiving pocket, wherein the lower surface of the cutting insert abuts the tangentially extending pocket base, the rear component side surface of the cutting insert abuts the radially extending pocket rear surface at two spaced apart abutment surfaces, the front component side surface forming a rake surface and the upper component cutting edge of the front component side surface forming an operative cutting edge.

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2. (Original) The rotary cutting tool according to Claim 1, wherein the pocket base has a radially extending threaded bore and each cutting insert of the plurality of cutting inserts has a through bore extending between the upper and lower surfaces and containing midpoints thereof, and each cutting insert is removably retained by a screw extending through the through bore and tightened into the threaded bore.

3. (Original) The rotary cutting tool according to Claim 1, wherein each upper and lower component cutting edge is generally concave in form and each component side surface is generally concave in form extending inwardly from adjacent side corners.

4. (Original) The rotary cutting tool according to Claim 1, wherein the upper and lower surfaces of the cutting insert each have a flat central portion.

5. (Previously Presented) The rotary cutting tool according to Claim 1, wherein the upper and lower component cutting edges and the component side surfaces are divided into three portions, two outer portions and an inner portion, the two outer portions being linear sections and the inner portion being arcuate and wherein the cutting insert is thicker in the region of the inner portion than in the region of the outer portion.

6. (Original) The rotary cutting tool according to Claim 1, wherein the upper and lower component cutting edges and the component side surfaces are divided into three portions, two outer portions and an inner portion, and the cutting insert is thicker in the region of the inner portion of the upper and lower component cutting edges than in the region of the outer portion thereof.

7. (Previously Presented) The rotary cutting tool according to Claim 1, wherein:
each cutting insert has a second opposite pair of its component side surfaces symmetrical with respect to said plane of rotation, and
each cutting insert axially protrudes on both sides of the tool body.

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8. (Withdrawn) A rotary cutting tool comprising:

a tool body in the form of a circular disk having a center and a periphery, with an axis of rotation passing through the center of the disk, said axis of rotation defining a plane of rotation;

a plurality of insert receiving pockets spaced angularly around the disk periphery, each insert receiving pocket comprising a pocket base having a leading end and a trailing end, the trailing end of the pocket base being connected to a pocket rear surface;

a plurality of indexable cutting inserts, each cutting insert comprising an upper surface, a lower surface and a peripheral side surface therebetween, the peripheral side surface comprising four component side surfaces, each component side surface being joined to an adjacent side surface by a side corner, a first opposite pair of the component side surfaces forming front and rear component side surfaces, each component side surface meeting the upper and lower surfaces at upper and lower component cutting edges, respectively, at least outer portions of each upper and lower component cutting edge extending generally inwardly from adjacent side corners and at least outer portions of each component side surface extending generally inwardly from adjacent side corners,

each cutting insert being removably retained in a given insert receiving pocket, wherein the lower surface of the cutting insert abuts the pocket base, the rear component side surface of the cutting insert abuts the pocket rear surface at two spaced apart abutment surfaces, the front component side surface forming a rake surface and the upper component cutting edge of the front component side surface forming an operative cutting edge, and wherein

each cutting insert has a second opposite pair of its component side surfaces symmetrical with respect to said plane of rotation, and

each cutting insert axially protrudes on both sides of the tool body.

9. (Currently Amended) The rotary cutting tool according to Claim [[8]] 16, wherein the pocket base has a radially extending threaded bore and each cutting insert of the plurality of cutting inserts has a through bore extending between the upper and lower surfaces and containing midpoints thereof, and each cutting insert is removably retained by a screw extending through the through bore and tightened into the threaded bore.

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10. (Currently Amended) The rotary cutting tool according to Claim [[8]] 16, wherein:

each component side surface is joined to an adjacent side surface by a side corner;

each component side surface meets the upper and lower surfaces at upper and lower component cutting edges; and

each upper and lower component cutting edge is generally concave in form and each component side surface is generally concave in form extending inwardly from adjacent side corners.

11. (Currently Amended) The rotary cutting tool according to Claim [[8]] 16, wherein the upper and lower surfaces of the cutting insert each have a flat central portion.

12. (Withdrawn) The rotary cutting tool according to Claim 8, wherein the upper and lower component cutting edges and the component side surfaces are divided into three portions, two outer portions and an inner portion, the two outer portions being linear sections and the inner portion being arcuate and wherein the cutting insert is thicker in the region of the inner portion than in the region of the outer portion.

13. (Withdrawn) The rotary cutting tool according to Claim 8, wherein the upper and lower component cutting edges and the component side surfaces are divided into three portions, two outer portions and an inner portion, and the cutting insert is thicker in the region of the inner portion of the upper and lower component cutting edges than in the region of the outer portion thereof.

14. (Withdrawn) The rotary cutting tool according to Claim 8, wherein each pocket base is a tangentially extending pocket base.

15. (Withdrawn) The rotary cutting tool according to Claim 8, wherein each pocket rear surface is a radially extending pocket rear surface.

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16. (Previously Presented) A rotary metal cutting tool comprising:

a tool body in the form of a circular disk having a center and a periphery, with an axis of rotation passing through the center of the disk, said axis of rotation defining a plane of rotation;

a plurality of insert receiving pockets spaced angularly around the disk periphery, each insert receiving pocket comprising a pocket base and a pocket rear surface; and

a plurality of indexable cutting inserts, each cutting insert removably retained in an insert receiving pocket, each cutting insert comprising an upper surface, a lower surface and a peripheral side surface therebetween, the peripheral side surface comprising at least four component side surfaces, wherein each cutting insert has:

a first opposite pair of its component side surfaces forming front and rear component side surfaces, the rear component side surface abutting the pocket rear surface at two spaced apart abutment surfaces; and

a second opposite pair of its component side surfaces symmetrical with respect to said plane of rotation, and

wherein each cutting insert axially protrudes on both sides of the tool body.

17. (Currently Amended) The rotary metal cutting tool according to claim 16, wherein:

all the cutting inserts are aligned with one another in an axial direction along the axis of rotation rotary axis, each component side surface of one cutting insert being axially aligned with a corresponding component side surface of each of the other cutting inserts.

18. (Withdrawn) The rotary metal cutting tool according to claim 8, wherein:

all the cutting inserts are aligned with one another in an axial direction along the rotary axis, each component side surface of one cutting insert being axially aligned with a corresponding component side surface of each of the other cutting inserts.

19. (Withdrawn) A rotary metal cutting tool comprising:

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a tool body in the form of a circular disk having a center and a periphery, with an axis of rotation passing through the center of the disk, said axis of rotation defining a plane of rotation;

a plurality of insert receiving pockets spaced angularly around the disk periphery, each insert receiving pocket comprising a pocket base and a pocket rear surface; and

a plurality of indexable cutting inserts, each cutting insert removably retained in an insert receiving pocket, each cutting insert comprising an upper surface, a lower surface and a peripheral side surface therebetween, the peripheral side surface comprising at least four component side surfaces, a first opposite pair of component side surfaces forming front and rear component side surfaces, the rear component side surface abutting the pocket rear surface at two spaced apart abutment surfaces, a second opposite pair of component side surfaces symmetrical with respect to said plane of rotation,

wherein all the cutting inserts are aligned with one another in an axial direction along the rotary axis, each component side surface of one cutting insert being axially aligned with a corresponding component side surface of each of the other cutting inserts.

20. (Withdrawn) The rotary metal cutting tool according to claim 19, wherein each cutting insert axially protrudes on both sides of the tool body.

21. (Previously Presented) A rotary metal cutting tool comprising:

a tool body in the form of a circular disk having a center and a periphery, with an axis of rotation passing through the center of the disk;

a plurality of insert receiving pockets spaced angularly around the disk periphery, each insert receiving pocket comprising a pocket base and a pocket rear surface; and

a plurality of indexable cutting inserts, each cutting insert removably retained in an insert receiving pocket, each cutting insert comprising an upper surface, a lower surface and a peripheral side surface therebetween, the peripheral side surface comprising at least four component side surfaces, a first opposite pair of component side surfaces forming front and rear component side surfaces, the rear component side surface abutting the pocket rear surface at two spaced apart abutment surfaces,

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wherein all the cutting inserts are symmetric about a common plane of rotation of the tool body.

22. (Previously Presented) The rotary metal cutting tool according to claim 21, wherein each cutting insert axially protrudes on both sides of the tool body.

23. (Withdrawn) A rotary metal cutting tool comprising:

a tool body in the form of a circular disk having a center and a periphery, with an axis of rotation passing through the center of the disk;

a plurality of insert receiving pockets spaced angularly around the disk periphery, each insert receiving pocket comprising a pocket base and a pocket rear surface; and

a plurality of indexable cutting inserts, each cutting insert removably retained in an insert receiving pocket, each cutting insert comprising an upper surface, a lower surface and a peripheral side surface therebetween, the peripheral side surface comprising at least four component side surfaces, a first opposite pair of component side surfaces forming front and rear component side surfaces, the rear component side surface abutting the pocket rear surface at two spaced apart abutment surfaces,

wherein the rear component side surface is the only component side surface abutted by the insert receiving pocket.

24. (Withdrawn) The rotary metal cutting tool according to claim 23, wherein all the cutting inserts are symmetric about a common plane of rotation of the tool body.

25. (Withdrawn) The rotary metal cutting tool according to claim 23, wherein each cutting insert axially protrudes on both sides of the tool body.

26. (New) The rotary metal cutting tool according to claim 16, wherein all the cutting inserts are aligned with one another in an axial direction along the axis of rotation, each component side surface of one cutting insert being axially aligned with a corresponding component side surface of each of the other cutting inserts.

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27. (New) The rotary metal cutting tool according to claim 16, wherein the rear component side surface is the only component side surface abutted by the insert receiving pocket.